Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-7. (Cancelled.)

8. (Original) A method for determining a position of a deformity-correcting fixator, the method comprising the steps of:

a) characterizing a mounting condition for a proximal bone fragment attachment apparatus and a distal bone fragment attachment apparatus;

b) determining a first set of fixator characteristics, wherein the first set of characteristics correspond to physical dimensions of the fixator and initial fixator settings;

c) determining a deformity correction matrix by solving a plurality of simultaneous equations, wherein the equations correspond to kinematic equations;

d) solving for a second set of fixator settings by equating the deformity correction matrix to a deformity correction transform; and

e) reconfiguring the deformity correcting fixator based on the second set of fixator settings.

9. (Original) The method of claim 8, wherein the deformity-correcting fixator comprises a unilateral fixator including a first and a second compound movable joint, wherein each compound movable joint provides deformity correction in two degrees of freedom, and a strut assembly, and a strut assembly which provides a third degree of freedom for each compound movable joint.

10. (Original) The method of claim 9 further comprising the steps of:

setting the first compound movable joint and the second compound movable joint according to the solution for the second set of fixator settings; and

repeating steps a) through d) as necessary to adjust the first compound movable joint and the second compound movable joint over time.

11. (Original) The method of claim 8 wherein the step of characterizing a mounting condition for a proximal bone fragment attachment apparatus and a distal bone fragment attachment apparatus further comprises the steps of:

a) determining an axial rotation for a proximal bone fragment attachment apparatus;

b) determining an anterior-posterior rotation for the proximal bone fragment attachment apparatus;

c) determining a lateral rotation for the proximal bone fragment attachment apparatus;

d) determining a pin offset for the proximal bone fragment attachment apparatus;

repeating steps a) through d) for a distal bone fragment attachment apparatus; and

determining the bone length.

12. (Original) The method of claim 8 wherein the first set of fixator settings comprise:

a reference pin clamp offset in the Z axis (RPC_off_z);

a reference roll joint offset in the X axis (rrj_off_x);

a reference roll joint offset in the Z axis (rrj_off_z);

a reference yaw joint offset in the X axis (ryj_off_x);

a reference yaw joint offset in the X axis (ryj_off_y);

a reference yaw joint offset in the Z axis (fyj_off_z);

a reference strut offset in the X axis (rstr_off_x);

a reference strut offset in the Z axis (rstr_off_z);

a moving strut offset in the X axis (mstr_off_x);

a moving strut offset in the Y axis (mstr_off_y);

a moving strut offset in the Z axis (mstr_off_z);

a moving roll joint offset in the X axis (mrj_off_x);

a moving roll joint offset in the X axis (mrj_off_y);

a moving roll joint offset in the Z axis (mjr_off_z);

a moving pitch joint offset in the X axis (mpj_off_x);

a moving pitch joint offset in the X axis (mjr_off-y);

a moving pitch joint offset in the Z axis (mpj_off_z);

a initial reference roll joint rotation ($rrj\_rot_{initial}$);

a initial reference pitch joint rotation ($rpj\_rot_{initial}$);

a initial reference yaw joint rotation ($ryj\_rot_{initial}$);

a initial reference strut offset in the Y axis ($rstr\_off\_y_{initial}$);

a initial moving roll joint rotation ($mrj\_rot_{initial}$); and

a initial moving pitch joint rotation ($mpj\_rot_{initial}$).

13. (Currently amended) The method of claim 8 wherein the step of characterizing a mounting condition for a proximal bone fragment attachment apparatus and a distal bone fragment attachment apparatus further comprises the steps of:

a) generating a digital x-ray image comprising a plurality of individual images, wherein the plurality of individual images correspond to a plurality of identifiable shapes associated with an imaging device and with the portion of body tissue;

b) detecting an edge of each of the plurality of individual images;

c) characterizing a coordinate system associated with the imaging device based on the determined geometric parameters;

d) determining the geometric parameters associated with each of the identified outlines;

e) characterizing a coordinate system associated with the imaging device based on the determined geometric parameters;

f) determining one or more anatomical axes associated with the portion of body tissue; and

g) characterizing the physical configuration of the portion of body tissue based on the one or more anatomical axes and the coordinate system;

h) repeating steps a) through g) [[h)]] for a second digital x-ray image.

14. (Original) The method of claim 13 wherein the imaging device comprises three balls, wherein the first ball is connected to a first end of a first rod, the second ball is connected to a first end of a second rod, the third ball is connected to a first end of a third rod, and second end of the first rod is connected to a second end of the second rod and a second end of the third rod.

15. (Original) The method of claim 14 wherein the first rod, the second rod, and the third rod are orthogonally opposed.

16. (Original) The method of claim 14 wherein the point where the second end of the first rod is connected to the second end of the second rod and the second end of the third rod comprises a fourth ball.

17-19. (Cancelled)

20. (New) A method for determining a position of a deformity-correcting fixator, the method comprising the steps of:

a) characterizing a mounting condition for a proximal bone fragment attachment apparatus and a distal bone fragment attachment apparatus, wherein characterizing a mounting condition includes

generating a first two-dimensional digital x-ray image comprising a first plurality of individual images corresponding to a first plurality of identifiable shapes associated with an imaging device on the deformity-correcting fixator;

generating a second two-dimensional digital x-ray image comprising a second plurality of individual images corresponding to a second plurality of identifiable shapes associated with the imaging device on the deformity-correcting fixator, the second digital x-ray image taken at an angle relative to the first digital x-ray image;

determining a three-dimensional coordinate system for the imaging device from the first and second two-dimensional digital x-ray images;

determining the mounting condition of the proximal bone fragment attachment apparatus and the distal bone fragment attachment apparatus based on the determined three-dimensional coordinate system for the imaging device;

b) determining a first set of fixator characteristics, wherein the first set of characteristics correspond to physical dimensions of the fixator;

c) determining a deformity correction matrix by solving a plurality of simultaneous equations, wherein the equations correspond to kinematic equations;

d) solving for a second set of fixator settings by equating the deformity correction matrix to a deformity correction transform; and

e) reconfiguring the deformity correcting fixator based on the second set of fixator settings.

21. (New) The method of claim 20, wherein the deformity-correcting fixator comprises a unilateral fixator including a first and a second compound movable joint, wherein each compound movable joint provides deformity correction in two degrees of freedom, and a strut assembly, and a strut assembly which provides a third degree of freedom for each compound movable joint.

22. (New) The method of claim 21, further comprising the steps of:

setting the first compound movable joint and the second compound movable joint according to the solution for the second set of fixator settings; and

repeating steps a) through d) as necessary to adjust the first compound movable joint and the second compound movable joint over time.

23. (New) The method of claim 20, wherein the deformity-correcting fixator comprises a circular fixator including a first and a second fixation element, wherein the first and second fixation elements are connected with a plurality of mechanisms that control the relationship of one of the first and second fixation element to the other.

24. (New) The method of claim 23, wherein the plurality of mechanisms comprises adjustable length struts.

25. (New) The method of claim 20, wherein the step of characterizing a mounting condition for a proximal bone fragment attachment apparatus and a distal bone fragment attachment apparatus further comprises the steps of:

a) determining an axial rotation for a proximal bone fragment attachment apparatus;

b) determining an anterior posterior rotation for the proximal bone fragment attachment apparatus;

c) determining a lateral rotation for the proximal bone fragment attachment apparatus;

d) determining a pin offset for the proximal bone fragment attachment apparatus;

e) repeating steps a) through d) for a distal bone fragment attachment apparatus; and determining the bone length.

26. (New) The method of claim 20, wherein the first set of fixator settings comprise:

a reference pin clamp offset in the Z axis (rpc_off_z);

a reference roll joint offset in the X axis (rrj_off_x);

a reference roll joint offset in the Z axis (rrj_off_z);

a reference yaw joint offset in the X axis (ryj_off_x);

a reference yaw joint offset in the Y axis (ryj_off_y);

a reference yaw joint offset in the Z axis (ryj_off_z);

a reference strut offset in the X axis (rstr_off_x);

a reference strut offset in the Z axis (rstr_off_z);

a moving strut offset in the X axis (mstr_off_x);

a moving strut offset in the Y axis (mstr_off_y);

a moving strut offset in the Z axis (mstr_off_z);

a moving roll joint offset in the X axis (mrj_off_x);

a moving roll joint offset in the Y axis (mrj_off_y);

a moving roll joint offset in the Z axis (mrj_off_z);

a moving pitch joint offset in the X axis (mpj_off_x);

a moving pitch joint offset in the Y axis (mpj_off_y);

a moving pitch joint offset in the Z axis (mpj_off_z);

a initial reference roll joint rotation ($rrj\_rot_{initial}$);

a initial reference pitch joint rotation ($rpj\_rot_{initial}$);

a initial reference yaw joint rotation ($ryj\_rot_{initial}$);

a initial reference strut offset in the Y axis ($rstr\_off\_y_{initial}$);

a initial moving roll joint rotation ($mrj\_rot_{initial}$); and

a initial moving pitch joint rotation ($mpj\_rot_{initial}$).

27. (New) The method of claim 20, wherein the step of characterizing a mounting condition for a proximal bone fragment attachment apparatus and a distal bone fragment attachment apparatus further comprises the steps of:

a) detecting an edge of each of the plurality of individual images;

b) identifying outlines from the plurality of individual image edges that correspond to the plurality of identifiable shapes associated with the imaging device;

c) determining the geometric parameters associated with each of the identified outlines;

d) characterizing ~~a~~ the three-dimensional coordinate system associated with the imaging device based on the determined geometric parameters;

e) determining one or more anatomical axes associated with the portion of body tissue; and

f) characterizing the physical configuration of the portion of body tissue based on the one or more anatomical axes and the coordinate system.

28. (New) The method of claim 27, wherein the imaging device comprises three balls, wherein each of the balls are spatially fixed in relationship to one another.

29. (New) A method for determining a position of a deformity-correcting fixator, the method comprising the steps of:

a) characterizing a mounting condition for a proximal bone fragment attachment apparatus and a distal bone fragment attachment apparatus;

b) determining a first set of fixator characteristics, wherein the first set of characteristics correspond to physical dimensions of the fixator;

c) determining a deformity correction matrix by solving a plurality of simultaneous equations, wherein the equations correspond to kinematic equations;

d) solving for a second set of fixator settings by equating the deformity correction matrix to a deformity correction transform; and

e) reconfiguring the deformity correcting fixator based on the second set of fixator settings.